1177 Comparison of Three Occlusal Indices of Orthodontic Treatment Need.

F. BEGLIN*, K. W. L.VIG, F. BECK, R. KUTHY, D. WADE
(Ohio State University, OH, USA).

Aims: Various occlusal indices are currently used to ascertain eligibility for orthodontic treatment. This study ranked the severity of malocclusion using objective and subjective criteria. A comparison of three indices of orthodontic treatment need(objective) was made with the consensus opinion of a panel of 15 experienced orthodontists(subjective). **Methods:** 170 sets of study casts representing a wide variety of malocclusions were selected. The casts were scored by an examiner who was calibrated in the following three indices: Dental Aesthetic Index (**DAI**), Handicapping Labiolingual Deviation with a California Modification (**HLDCal Mod**) and Index of Orthodontic Treatment Need (**IOTN**). A panel of 15 experienced orthodontists individually rated the same casts on their degree of orthodontic treatment need. The consensus opinion of the panel was used as the 'gold standard' for evaluating the accuracy of the indices. The sensitivity and specificity of each index was evaluated at various scores and plotted on Receiver Operating Characteristic (ROC) curves. **Results:** Intra and inter-rater reliability was high (Weighted Kappa > 0.8). All three indices produced desirable ROC curves. Overall accuracy of the indices was determined by calculating percent area under the curve: DAI 94.9%, HLDCalMod 94.0% and IOTN 98.3%. Using the ROC curve the optimum score for each of the indices are as follows: DAI 28, HLDCalMod 12 and IOTN 3. These scores are the point at or above which treatment is indicated. These scores differ from the scores currently in use for these indices (DAI 31, HLDCalMod 26, IOTN 4) **Conclusions:** 1)The DAI, HLDCalMod and IOTN provide information which aids in determining orthodontic treatment need and 2) optimum scores for these indices were obtained by ROC curves.

Supported by AAOF Grant and NIDR DE09983.

1178 THE INFLUENCE OF EARLY CLASS II TREATMENT ON DURATION OF TREATMENT.

C. Tulloch*, L. Rogers, C. Phillips, University of North Carolina, Chapel Hill, NC

The influence of the timing of treatment on the duration of treatment is an important but unresolved issue. Claims have been made that early treatment may either increase or decrease treatment time. Of the 166 patients completing phase 1 of a randomized trial of Class II treatment, 144 are continuing in the trial. After all primary teeth were lost, the patients were randomized to different doctors for Phase 2 treatment, stratified on the basis of their early treatment group (15 months with headgear, functional appliance or observation only). This study reports on the treatment length of the first 80 patients completing Phase 2. Three patients completing all treatment with functional appliances only are excluded. The total length of Phase 2 treatment (TP2), including interim treatments and partial appliances, and the time in full fixed appliances (FFA) is reported in months (median and IQR) for each doctor. No inferential statistics are included since phase 2 of the trial is not yet complete.

	Control		Functional		Headgear	
	TP2	FFA	TP2	FFA	TP2	FFA
Dr. A	27.7 (10.6)	25.2 (10.3)	21.9 (10.3)	21.9 (10.3)	24.3 (8.8)	24.3 (8.8)
Dr. B	34.1 (13.8)	33.9 (10.1)	20.0 (3.3)	20.0 (3.3)	36.0 (13.1)	36.0 (13.1)
Dr. C	34.6 (18.2)	20.5 (11.1)	31.6 (15.0)	22.6 (3.8)	25.0 (16.5)	25.0 (12.3)

There was wide variation in the treatment time both among patients, among doctors and among phase1 groups In general, the TP2 and FFA were shorter for both early treatment groups, than for the control group. However, if the additional treatment during Phase 1 is considered, this data suggests that early growth modification, when carried out as a separate phase of treatment, does increase the total treatment time. Supported by NIH grant DE08708

1179 Post Retention Changes in Lower Curve of Spee Following Non-Extraction Orthodontics.

EA KINOWSKI, DJ FERGUSON, VB DHURU, DS BOGENSCHUTZ*
(Marquette University, Milwaukee, WI).

Long-term stability is a primary goal in orthodontic treatment. The purpose of this study was to evaluate post retention changes in the mandibular curve of Spee and selected mandibular arch dimensions, i.e. arch circumference and interdental widths of canines, premolars and molars. The sample consisted of 22 randomly selected cases treated bynon-extraction orthodontic therapy in the permanent dentition; average post-retention time was about 5 years. Lateral cephalometric radiographs were traced to evaluate overbite and interincisal angle. Pre-treatment, post-treatment and post-retention study models were measured in three-dimensions utilizing a precision milling machine. Paired t-tests were used to identify statistically significant differences at $P<0.05$. Overbite increased 0.63mm ($P<0.01$) post-retention but interincisal angle remained stable. For the post retention sample of mandibular arches studied, inter-canine width decreased 0.35mm to near its pre-treatment dimension during the post-retention period, expansion of premolars and first molars remained stable, and second molars continued to expand 0.39mm. Arch circumference continued to decrease post-retention. Second premolars underwent the greatest extrusion (0.74mm, $P<0.05$) followed by first premolars (0.48mm, $P<0.05$) during active therapy and both premolars demonstrated vertical stability post-retention. Cuspids and first molars showed no significant ($P>0.05$) vertical change throughout the study period. We conclude that orthodontic leveling in the mandibular arch remained stable post retention in the sample treated orthodontically utilizing non-extraction therapy.

1180 Condyle-Fossa Joint Space Ratio Following Premolar Extraction Orthodontic Therapy.

KK Kundinger, DJ Ferguson, BP Austin, SJ Donegan, KS Vogel*
(Marquette University, School of Dentistry, Milwaukee, WI).

The biologic effects of premolar extraction orthodontic therapy on the temporomandibular joint has been challenged over the past decade. In particular, the position of the mandibular condyle within the glenoid fossa following orthodontic treatment has been a source of contention. The purpose of this study was to evaluate the concentric position of the mandibular condyle within the fossa in untreated subjects as well as subjects treated with premolar extraction orthodontic therapy. The control sample was 28 healthy dental students (mean age 27.3 years) with varying malocclusions and no history of extraction or orthodontic treatment; 29 subjects (mean age 22.5 years) who had undergone comprehensive orthodontic therapy with maxillary and/or mandibular premolar extraction comprised the experimental group. Submental vertex and corrected axis tomograms were secured, each tomogram was cut and mounted in a 35mm slide holder and projected with a 103mm lens at exactly 10x enlargement. Narrowest anterior and posterior distances from condyle to glenoid fossa were measured with a digital caliper to the nearest 0.01mm, and a joint space ratio was computed. T-testing revealed no significant differences in space ratios between the control and orthodontically treated groups at a probability level of 0.05. In the sample tested, orthodontic treatment did not influence mandibular condyle to fossa position.

1181 Comparing Orthodontic Treatment Outcome of Two Geographically Different Clinic Samples.

R. FEGHALI*, S. NELSON, AND M.G. HANS.
(Craniofacial Research Group, Case Western Reserve Univ., Cleveland, Ohio, USA).

The effectiveness of orthodontic treatment in reducing the severity of malocclusion has been assessed in previous studies. The aim of this study was to compare the outcome of orthodontic treatment between two geographically different orthodontic clinic samples using the Peer Assessment Rating (PAR) index. The sample consisted of 125 subjects from the orthodontic clinic at Case Western Reserve University (CWRU), and 125 subjects from the University of Southern California (USC). All cases were debanded between 1994 and 1996. Gender, race, date of birth, and parental occupation were also abstracted from the patients' dental records. Significance was assessed using t-tests and chi-square. The demographic characteristics of the two samples indicated that there were significant differences ($p<0.05$) in the pre-treatment age (CWRU 14.7 years ± 6.03 vs. USC 17.4 years ± 8.74), and ethnicity (CWRU 76% Caucasians, USC 29%). There were no significant mean differences in treatment duration between CWRU (34.08 months ± 18.58) and USC (34.87 months ± 14.72). The mean pre- and post-treatment PAR scores for CWRU were 28.73±7.96 and 8.27±3.89 respectively; while for USC, these were 30.07±10.12 and 8.91±5.34. The pre- and post-treatment differences were not significant ($p<0.05$) between the two clinics. For CWRU, 49% of the cases were "greatly improved" (defined as a drop of 22 points from pre- to post-treatment scores), 48% were "improved" (having a 30% drop between pre- and post-tx scores), and only 3% did not improve (drop in PAR scores < 30%). For USC 46% of the cases were "greatly improved", 51% were "improved", and only 3% did not improve. Therefore, we conclude that the outcome of Orthodontic treatment rendered at these two dental clinics was completed with a similar overall success rate of 97%, despite geographic and demographic differences. This study was supported by the CWRU Orthodontic Alumni Endowment Fund, the Bolton-Brush Growth Study Center, and the USC Orthodontic Department.

1182 Assessing the outcome of orthodontic treatment using the PAR index

B. Mehdizadeh*, S. Nelson, M. Hans, R. Feghali
(Craniofacial Research Group, Case Western Reserve University, Ohio, USA)

The Peer Assessment Rating (PAR) is a simple, reproducible index that is of interest to many orthodontists and health care agencies. The objective of this study was to assess the outcome of orthodontic treatment of the last 92 debanded orthodontic cases at Case Western Reserve University between July 1, 1995 and July 1, 1996. Pre- and post-treatment PAR scores of each patient were measured from the study casts. The median pre-treatment age was 13 years(1st quartile 11, 3rd quartile 15) and the median treatment duration was 33.3 months (1st quartile 22.4, 3rd quartile 46.9). The averages for pre- and post-treatment PAR scores were 29.08 ±9.71 and 8.01 ±4.15 respectively. From the results, 53% (53/100) of patients were greatly improved (defined as a post-treatment PAR score at least 22 points lower than pre-treatment), while 47% (47/100) had a post-treatment PAR score 30% lower than the pre-treatment (defined as "improved"). None (0/100) of the patients showed a drop in the PAR score less than 30% (no improvement). We conclude that in the last 92 cases debanded in the orthodontic clinic, 100% of the patients showed evidence of improvement (at least 30% improvement between pre- and post-treatment PAR scores). In future investigations, the relationship between other variables and their impact on treatment outcome will be studied. This research was supported by the Bolton-Brush Growth Study Center and the CWRU Orthodontic Alumni Fund.

1183 Assessment of Orthopedic Treatment of Class III Malocclusion Using P.A.R. Index.

P. NGAN*, C. YIU, U. HAGG, S.H.Y. WEI (West Virginia University, Morgantown, U.S.A. and The University of Hong Kong, Hong Kong)

The Peer Assessment Rating (PAR) index was developed with the purpose of quantitativcly showing the extent that orthodontic treatment reduces the severity of malocclusion. The purpose of this study was to assess the effects of early orthopedic treatment of Class III malocclusion on the PAR index score. The sample consisted of 27 Chinese, ages 6 to 11 years, with skeletal Class III malocclusion treated by maxillary protraction headgear. Study casts were taken before treatment (T1), 6 months during treatment (T2) and one year after removal of appliances (T3). PAR scores were calculated. Differences among the 3 time periods were analyzed using ANOVA.

	T1	T2	Diff	T3	Diff
Mean	38.0	16.1	21.8***	11.4	4.7*
S.D.	7.1	8.2		7.9	

* = p<.05, *** = p<.001

In all cases, reduction in PAR scores was found at T2 (mean = 57%). Further reduction in PAR score was found at T3 (mean = 25%). Reduction in PAR score was mainly contributed by correction of anterior crossbite. After removal of appliance, further reduction in PAR score was contributed by better alignment of the anterior segment, improvement of buccal occlusion, overbite and midline correction. These results indicate significant reduction in the severity of Class III malocclusion during and after early orthopedic treatment with protraction headgear. (Supported by CRCG Grant, The University of Hong Kong.)

1184 Clinical Evaluation of Pre-HL Versus Post-HL Dentin Bonding Systems.

S.C. BAYNE*, H.O. HEYMANN, A.D. WILDER, J.R. STURDEVANT, T.M. ROBERSON, T.B. SLUDER, K.N. MAY. (UNC, Chapel Hill, NC 27599-7450).

Clinical trials of older (OLD) Class V adhesive systems (Heymann *et al., J Am Dent Assoc*, 1991) concluded that specific co-variables (lesion shape, patient age, traumatic occlusion, material modulus) affected retention. The objective was to compare pooled data for OLD versus NEW (known to form hybrid layers) dentin bonding systems (DBS) over 3 years to determine if the earlier co-variables were still important.

Pooled results (n=447) for Class V adhesive and/or restoration combinations for 2 OLD DBS's (Caulk PUB-1/Prisma-Fine or -Fil; 3M SB-1/Silux Plus) were compared to pooled data for 4 NEW DBS's (Fuji II LC Caps, Caulk Variglass, Kerr OptiBond/Herc-XRV, Caulk ProBond/TPH). Two NEW systems were resin-modified glass ionomers (RMGI) and two were DBS/composites. Clinical results (% failure) were analyzed (Chi Square, $p\leq0.05$) for USPHS categories, sensitivity, and retention at 0, 6-12, 18-24, and 36 months.

Evaluation Period:	Recall (N) OLD	Recall (N) NEW	RETENTION OLD	RETENTION NEW
Baseline	128	260	100%	100%
6 - 12 Mths	63	256	92%	99%
18 - 24 Mths	63	184	76%	100%
36 Mths	63	86	73%	98%

Retention, color, margin discoloration, and margin integrity recall ratings were better for NEW vs. OLD systems ($p\leq0.05$). Excellent retention for NEW systems precluded analysis of co-variable effects but suggested that hybrid layer formation has substantially reduced or delayed earlier effects. No retention differences occurred between RMGI and DBA/composite NEW systems at 2 year recalls. (Supported by LD Caulk, Kerr, GC, and Bayer)